

SPIXIANA	8	3	221–229	München, 30. Dezember 1985	ISSN 0341-8391
----------	---	---	---------	----------------------------	----------------

Exastilithoxus hoedemani, a new species of Mailed Catfish from Rio Marauá, Est. Amazonas, Brazil

(Pisces, Siluriformes, Loricariidae)

By I. J. H. Isbrücker & H. Nijssen

Instituut voor Taxonomische Zoölogie, Zoölogisch Museum, Universiteit van Amsterdam

Abstract

Exastilithoxus hoedemani n. sp. is described from Rio Marauá, Brazil, near the border with Venezuela. It is compared directly with *E. fimbriatus* (Steindachner, 1915), known from the holotype from Río Cuquenán, Venezuela, which is redescribed. Both species are illustrated. They are the only known representatives of the genus *Exastilithoxus* Isbrücker & Nijssen, 1979.

Introduction

During a short visit to Munich some years ago, the new species described below as *Exastilithoxus hoedemani* was found. It is based upon three specimens, which were collected more than two decades ago in a poorly known area. The genus *Exastilithoxus* was hitherto known only from the holotype of *E. fimbriatus* (Steindachner, 1915) from the Río Cuquenán in Venezuela. *Exastilithoxus hoedemani* is compared directly with *E. fimbriatus*, a redescription of which is given. Both species are illustrated. Morphometric and meristic data are taken in the same way as for *Lasiancistrus* spp. in HEITMANS, NIJSSEN & ISBRÜCKER (1983). Specimens are deposited in the following institutions: Instituto Nacional de Pesquisas da Amazônia, Manaus (INPA), Naturhistorisches Museum Wien, Vienna (NMW), Zoologische Staatssammlung München (ZSM), and Instituut voor Taxonomische Zoölogie, Amsterdam (ZMA).

For the loan and/or exchange of specimens and for information we like to express our thanks to Dr. F. Terofal and Prof. Dr. E. J. Fittkau (ZSM), to Mrs Dr. L. H. Rapp Py-Daniel and Dr. A. dos Santos (INPA), and to Dr. P. Kähnsbauer (retired, NMW). The photographs were made by Mr L. A. van der Laan (ZMA).

Exastilithoxus Isbrücker & Nijssen, 1979

Exastilithoxus Isbrücker & Nijssen, in Isbrücker, 1979: 88 & 91 (type-species, by original designation and monotypy, *Pseudacanthicus (Lithoxus) fimbriatus* Steindachner, 1915 = *Exastilithoxus fimbriatus*).

Exastilithoxus is a genus of the subtribe Lithoxina, tribe Pseudacanthicini of the subfamily Ancistrinae (ISBRÜCKER, 1980). It is easily distinguished from the other genera of Lithoxina (*Lithoxus* Eigenmann, 1910, and *Paralithoxus* Boeseman, 1982; the latter was originally established as a subgenus of the former) by the possession of numerous barbels around the upper and lower lips. Such barbels are not present in any other genus of the subfamily Ancistrinae.

The subtribe Lithoxina consists of *Lithoxus* with a single species, *Paralithoxus* with four species (BOESEMAN, 1982), and *Exastilithoxus* with two species. We have an undescribed species of *Lithoxus* and one of *Paralithoxus*, which will be described elsewhere.

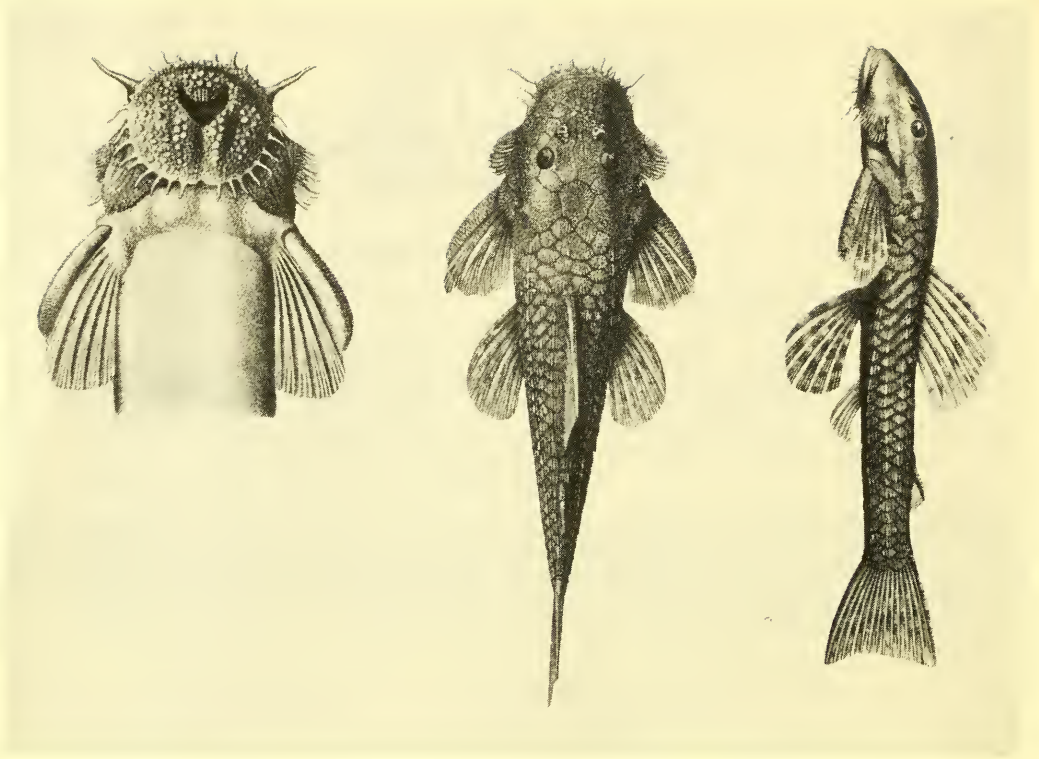


Fig. 1. *Exastilithoxus fimbriatus* (Steindachner, 1915), reproduction of the original illustrations of the holotype by J. Fleischmann (in STEINDACHNER, 1915b, pl. 10 figs. 1–3).

***Exastilithoxus fimbriatus* (Steindachner, 1915)**
(Figs. 1–2; table I (A) and I A)

Pseudocanthicus fimbriatus Steindachner, 1915a: 201 (original description; misspelling in generic name; type-locality: “Coquenánfluß”).

Pseudacanthicus (Lithoxus) fimbriatus; Steindachner, 1915b: 92–93 (pp. 78–79 of reprint), pl. 10 figs. 1–3 (description of “n. sp.”; holotype; Coquenán-Flusse).

Lithoxus fimbriatus; Schultz, 1944: 307 (abstract from Steindachner’s “1917” = 1915b description; Río Coquenán, tributary to Río Caroní, Venezuela), – Gosline, 1945: 97 (listed; río Coquenán, Venezuela), – Fernández Yépez, 1946: 5 (listed; vernacular name: Corroncho), – Mago Leccia, 1970: 85 (listed).

Exastilithoxus fimbriatus; Isbrücker & Nijssen, in Isbrücker, 1979: 88 (listed), p. 91, fig. 8 (type-species of *Exastilithoxus*; discussion; holotype; Steindachner’s 1915b description considered the original description), – Isbrücker, 1980: 78 (listed).

Material examined: NMW 44418, holotype, SL 53.3 mm, Venezuela, Estado Bolívar, Río Cuquenán, tributary to Río Caroní, Río Orinoco basin, coll. J. D. Haseman, III-1913; vernacular name: Yaravi.

Description: Morphometric data are given in table I A and I (A).

Counts. – Lateral body scutes 28 on the left side, 27 on the right side, including a triangular scutelet on the caudal fin base. Small, triangular scutelets on the caudal fin base (left/right side) 5/7 in vertical series. Predorsal scutes 4, between the supraoccipital process and the procurvent dorsal fin spinule: (a) one at either side of the supraoccipital process; (b) a large median scute with a median suture, anteriorly

reaching the supraoccipital process; (c) a median, transversely elongate scute with a median suture; and (d) a posteriorly concave scute with a median suture, surrounding the procurvent dorsal fin spinule. Along the dorsal fin base 8 scutes; 6 scutes between the last dorsal fin ray and the base of the adipose fin spine; 7 scutes between the base of the adipose fin spine and the procurvent caudal fin spinule. One azygous preadipose scute. Along the anal fin base 2 scutes; 11 scutes between the last anal fin ray and the procurvent caudal fin spinule. Just behind the head 3 scutes at either side in transverse series, interrupted by a wide, naked area dorsal to the lowest of these scutes. Along the base of the adipose fin membrane 3 scutes. Body scutes in 5 principal longitudinal series.

Dorsal fin with a small procurvent spinule – which is part of the dorsal fin spine locking mechanism – a feeble, slender spine, and 6 branched rays, last one split to its base. Anal fin with a feeble, slender spine, and 4 branched rays, last one split to its base. Pectoral fin with a firm spine, and 6 rays. Pelvic fin with a feeble, thick spine, and 5 rays. Caudal fin with 2 procurvent spinules (reminiscent of azygous scutelets) in front of the feeble, slender upper caudal fin spine, 13 (an unusual count: 14 is usual among Ancistrinae) branched rays (7 rays in the upper lobe, 6 in the lower lobe), a feeble, slender lower caudal fin spine, and a procurvent spinule in front of the latter.

Evertible interopercular odontodes, about 37 on the left side and about 34 on the right side.

Premaxillary teeth 3 in either jaw; mandibular teeth 6 in either jaw.

Upper lip barbels 5/4, lower lip barbels 9/9, anterior and posterior to the maxillary barbel, respectively.

Shape and structure (figs. 1–2): Dorsum and sides of body and head, and caudal peduncle completely covered with scutes and dermal ossifications; there are naked areas along the dorsal and anal fin bases, and dorsal to the pectoral and pelvic fin bases. Supraorbital rim hardly raised.

Table I. Morphometric data of *Exastilithoxus* spp.; A and (A), holotype of *E. fimbriatus* (Steindachner, 1915); B and (B), holotype of *E. hoedemani* n. sp.; C and D, paratypes of *E. hoedemani*.

specimen	ratios of SL				ratios of HL				mm	
	A	B	C	D	A	B	C	D	(A)	(B)
mature male	+	-	-	-	+	-	-	-	+	-
standard length	53.3	50.9	46.1	25.1	53.3	50.9	46.1	25.1	53.3	50.9
axial length	-	-	-	-	-	-	54.2	30.1	64.1	60.2
total length	-	-	-	-	-	-	58.1	31.7	64.8	64.2
head length	3.2	3.1	3.1	2.9	-	-	-	-	16.8	16.2
predorsal length	2.4	2.3	2.4	2.2	0.8	0.7	0.8	0.8	22.5	22.1
postdorsal length	2.9	2.6	2.5	2.5	0.9	0.8	0.8	0.8	18.5	19.8
postanal length	3.4	3.2	3.2	3.3	1.1	1.0	1.0	1.1	15.5	15.7
dorsal fin base	4.9	6.2	6.2	6.8	1.5	2.0	2.0	2.3	11.0	8.2
interdorsal length	4.9	4.2	4.5	4.6	1.5	1.3	1.4	1.6	10.9	12.1
dorsal spine length	4.5	4.4	4.6	4.8	1.4	1.4	1.5	1.7	11.8	11.5
anal spine length	7.8	7.6	7.4	7.4	2.5	2.4	2.4	2.4	6.8	6.7
anal fin height	6.3	7.1	7.0	6.6	2.0	2.3	2.2	2.3	8.5	7.2
pectoral spine length	4.8	4.7	4.8	4.4	1.5	1.5	1.5	1.5	11.2	10.9
pelvic spine length	4.2	4.0	4.2	4.3	1.3	1.3	1.4	1.5	12.7	12.9
adipose spine length	15.7	11.8	11.2	15.7	4.9	3.8	3.6	5.4	3.4	4.3
upper caudal spine length	5.0	4.4	4.9	-	1.6	1.4	1.6	-	10.6	11.6
lower caudal spine length	7.4	3.8	3.8	3.8	2.3	1.2	1.2	1.3	7.2	13.3
snout length	6.4	5.6	5.6	5.6	2.0	1.8	1.8	1.9	8.3	9.1
lower lip length	16.7	13.4	13.6	12.6	5.3	4.3	4.3	4.3	3.2	3.8
protruding maxillary barbel	17.2	21.2	19.2	27.9	5.4	6.8	6.1	9.6	3.1	2.4
maxillary barbel + lip width	10.1	10.2	9.6	12.0	3.2	3.2	3.1	4.1	5.3	5.0
thoracic length	4.1	4.6	4.4	4.7	1.3	1.5	1.4	1.6	13.0	11.0
abdominal length	4.8	4.6	5.1	5.2	1.5	1.5	1.6	1.8	11.2	11.0
maximum orbital diameter	19.0	21.2	20.0	16.7	6.0	6.8	6.4	5.7	2.8	2.4
interorbital width	11.3	10.0	10.7	10.0	3.6	3.2	3.4	3.4	4.7	5.1
cleithral width	3.4	3.3	3.6	3.7	1.1	1.1	1.1	1.3	15.8	15.3
supracleithral width	4.9	4.4	4.7	5.1	1.5	1.4	1.5	1.8	11.0	11.6
head depth	7.7	7.1	7.7	7.6	2.4	2.3	2.5	2.6	6.9	7.2
body depth at dorsal fin	8.9	7.3	8.0	7.0	2.8	2.3	2.5	2.4	6.0	7.0
body width at dorsal fin	4.9	4.9	5.2	6.0	1.6	1.6	1.7	2.1	10.8	10.4
body width at anal fin	7.3	7.3	7.8	8.4	2.3	2.3	2.5	2.9	7.3	7.0
depth caudal peduncle	10.9	10.4	11.0	12.6	3.4	3.3	3.5	4.3	4.9	4.9
width caudal peduncle	31.4	33.9	35.5	41.8	9.9	10.8	11.4	14.3	1.7	1.5

Dermal ossifications, scutes, fin spines, and most of the rays covered with odontodes, except for the ventral part of the scutes anterior to the distal part of the anal fin rays, which area is covered with bare skin.

The holotype is a nuptial male. The odontodes on the scutes are prominent, arranged into horizontal ridges stretching from about the height of the dorsal fin origin. The first 6 or 7 lateral body scutes bear very prominent, acute odontodes near to the posterior margin. Head, particularly sides and dorsum of the snout, rough, because of numerous erect and oblique acute odontodes. Ventral margin of operculum with a series of comb-like odontodes. Cleithrum covered with numerous long and slender, slightly antrorse odontodes. They resemble the evertible interopercular odontodes, which, however, are considerably longer. Sides and dorsum of pectoral fin spine close-set with long and slender odontodes with an antrorse tip. Dorsum of first three pectoral fin rays with decreasingly prominent, erect, slender odontodes arranged into a single row on each ray; first two pelvic fin rays with similar, although much shorter odontodes. The adipose fin spine is rough. The pelvic fin spine and ventral part of the pectoral fin spine show rather broad odontodes. Minute odontodes on dorsal and anal fin spine, and on caudal fin. Sides and dorsum of the snout covered with small, irregular, firmly fused scutelets. The posterior evertible interopercular odontodes are gradually longer than the anterior ones, which merge gradually with the adjacent inevertible odontodes. Body and head ventrally flat. Body at the height of dorsal fin origin oval, depressed, and at the height of adipose fin origin compressed, slightly convex. Dorsum of body flat posterior to dorsal fin origin. Abdomen and ventral part of head naked.

The specimen is now in a rather poor state of preservation. STEINDACHNER (1915b: 92/78) described the shape of the fins: „Pectoralstachel sehr kräftig, dicht mit Borsten besetzt; der steife Teil desselben etwas kürzer als der nächstfolgende Gliederstrahl, dessen Spitze bis zur Einlenkungsstelle der Ventrals zurückreicht und der kaum länger als der schlanke biegsame Stachel der strahligen Dorsale ist. Der obere Rand der letzteren ist geradlinig, die Entfernung des letzten Gliederstrahles der Dorsale von der Fettflosse steht der Basislänge der 1. Dorsale nur wenig nach. Die Spitzen der Caudalstrahlen sind bei dem mir vorliegenden Unikum teilweise beschädigt. Der hintere Rand der Caudale ist mäßig schräg gestellt und im mittleren Teile, wie es scheint, schwach konkav.“ (fig. 1). Adipose fin membrane triangular, with a convex outer margin. Lateral line and other pores invisible. Free margin of the long operculum curved. Outer and ventral surface of upper lip narrow. Upper lip merges completely with the lower lip, which is much broader. Lips now with few, flat papillae; STEINDACHNER (1915b: 92/78) stated: „Vorderes und hinteres Mundsegel an der Unterseite mit verhältnismäßig großen Papillen dicht besetzt, am Rande mit zahlreichen Cirrhen besetzt, von denen die des vorderen Mundsegels länger als die des hinteren Segels und letztere kürzer als die Eckbartel sind.“ Although the lips have suffered from drought, the upper lip barbels are considerably shorter than the lower lip barbels, which is also shown in J. Fleischmann's accurate illustrations of the holotype in STEINDACHNER'S plate 10 figs. 1–3 (1915b). Posterior margin of lower lip with small, flap-like extensions. Premaxillae surrounded by rather prominent papillae in the buccal cavity. Median two premaxillary teeth in each jaw about twice as long and at least twice as thick as the mandibular teeth, the outer tooth being considerably smaller than the median ones. The inner premaxillary tooth has a small outer lobe, the middle one has a minute outer lobe, and the outer tooth is simple. All three have a long, acute crown. All but one of the mandibular teeth are simple, with a long, acute crown. In the left mandible, the fourth tooth as counted from the symphysis is bifid, with a larger outer lobe; unfortunately, some of the teeth in the right mandible are damaged.

Colour (fig. 1). – The specimen is now dark tan, showing almost nothing of its natural pigmentation (except for some faint pigment dots on the caudal fin). The prominent odontodes have a yellowish stalk and a reddish-brown tip. STEINDACHNER (1915b) described the colour pattern in a single sentence: „Strahlige Dorsale und Caudale zart dunkel gefleckt.“

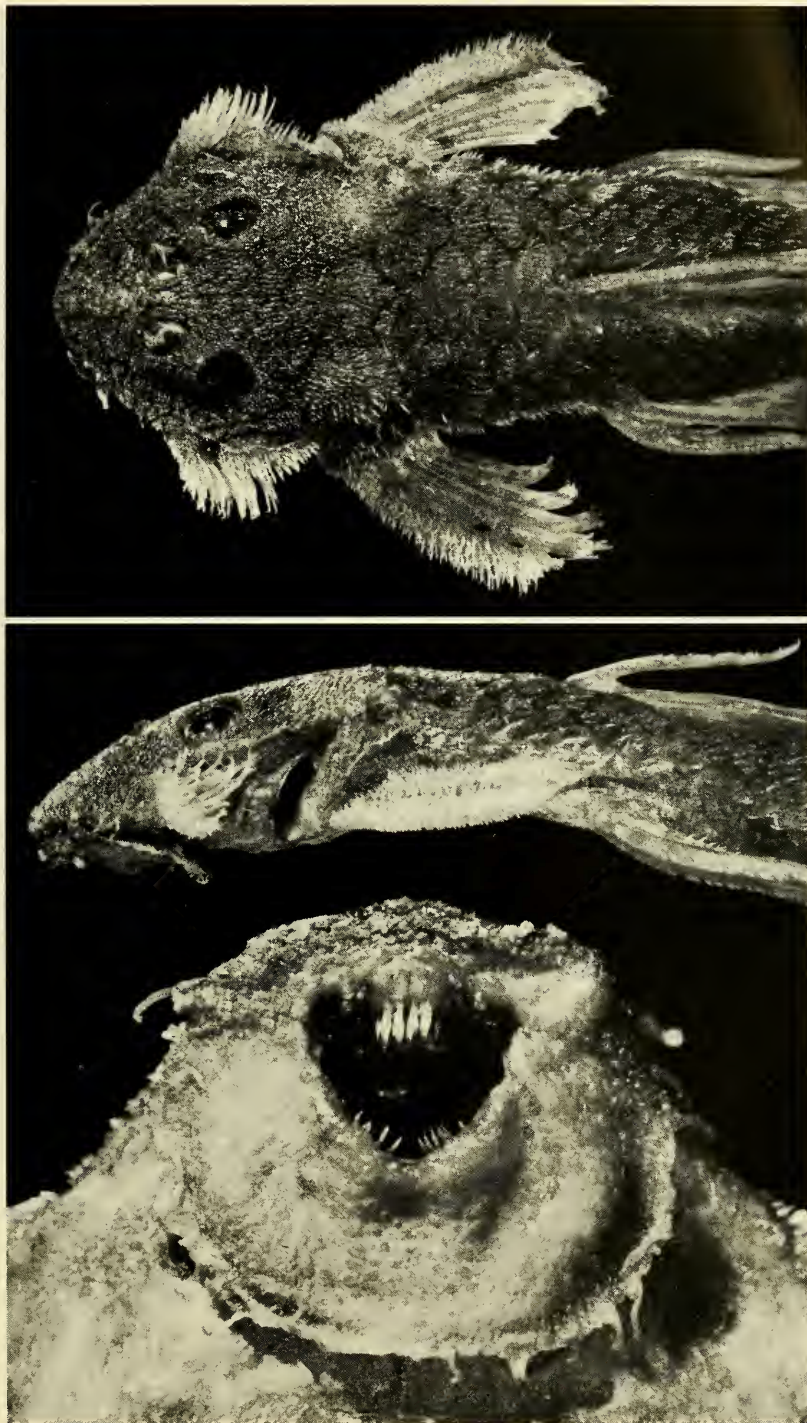


Fig. 2. *Exastilithoxus fimbriatus* (Steindachner, 1915), anterior part of the holotype in dorsal and lateral view and the mouth in ventral view.

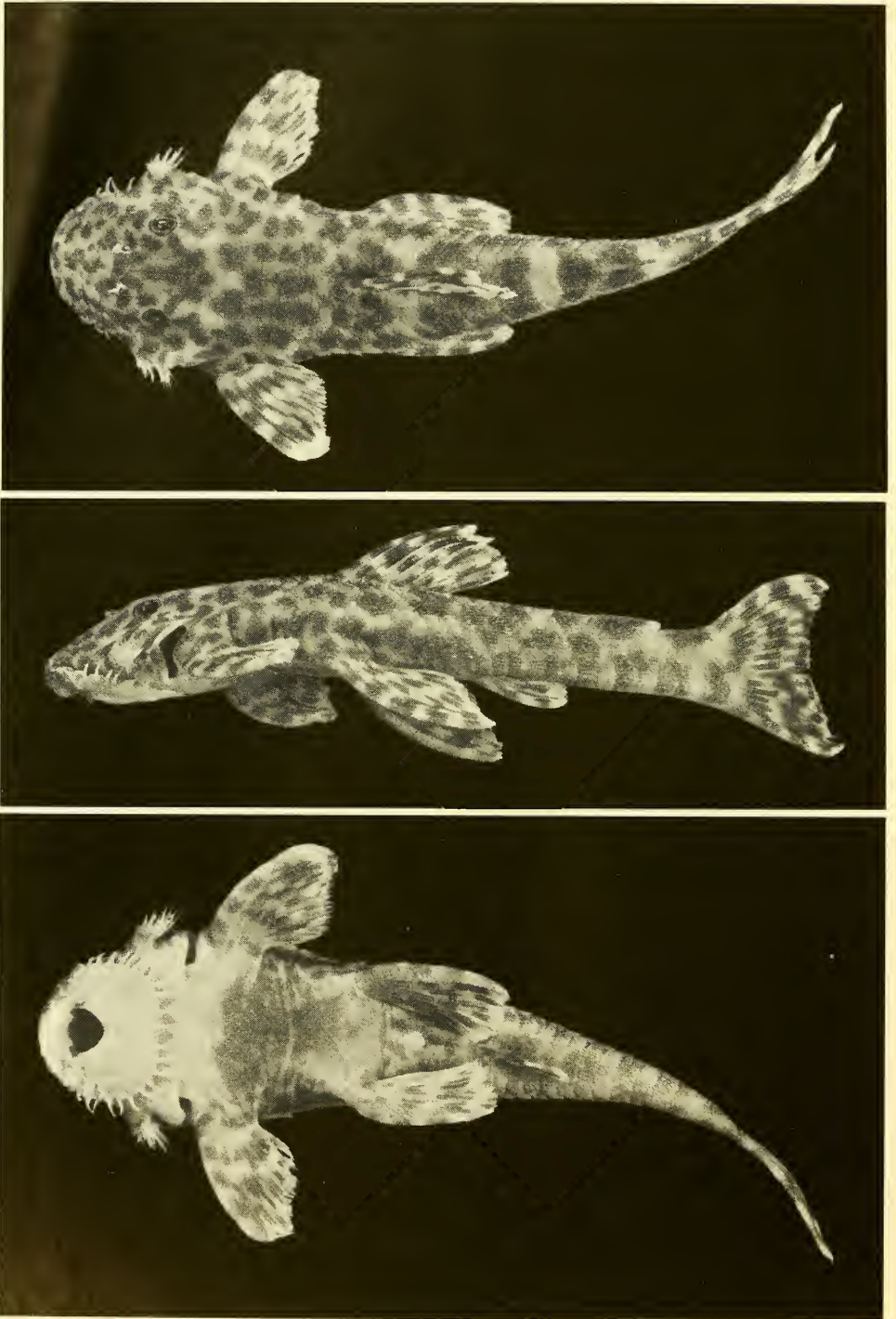


Fig. 3. *Exastilithoxus hoedemani* n. sp., holotype in dorsal, lateral and ventral view.

Exastilithoxus hoedemani n. sp.
(Figs. 3–4; table I (B) and I B–D)

Material examined: INPA 506, holotype, SL 50.9 mm; ZSM 26070, 1 paratype, SL 46.1 mm; ZMA 116.639, 1 paratype, SL 25.1 mm: Brazil, Est. Amazonas, Rio Mauraiá, foot of the Sierra Neblina, Cachoeira “Pora Comeschie”, Rio Negro basin, coll. E. J. Fittkau, 28-I-1963.

Note on the type-locality. – Dr E. J. Fittkau and Dr A. dos Santos (through Dr F. Terofal and Mrs Dr L. H. Rapp Py-Daniel, respectively) provided the following precision of the type-locality: „Dicht oberhalb Endstation. Benthos aus der Strömung.“ Cachoeira means waterfall, and Pora Comeschie (phonetically, though orthographically probably not correct) is the name the Indians told to Dr Fittkau... The Rio Mauraiá comes at this place out of the Sierra Neblina (the border mountains to Venezuela) with several waterfalls; the Cachoeira Pora Comeschie was the last one Dr Fittkau could reach by boat during his excursion up this river into the border region to Venezuela. The Sierra Neblina was discovered in the early 1950ies, by aeroplanes flying over, exactly measured during the middle 60ies, ... (it) has peaks over 3000 m...”

Description: Morphometric data are given in table I B-D and I (B). *Exastilithoxus hoedemani* was directly compared with the holotype of *E. fimbriatus*; in the description below the differences with *E. fimbriatus* are emphasized.

Counts (those of the holotype first, followed by those of the larger and smaller paratype, respectively, in parentheses; left/right): Lateral body scutes 27/28 (28/28, 27/27). Small, triangular scutelets on the caudal fin base 8/8 (8/6, 6/6) in vertical series. Predorsal scutes 5 (4 in *E. fimbriatus*); instead of one pair in *E. fimbriatus* as indicated under (c), there are in *E. hoedemani* two pairs of median, transversely elongate scutes in an irregular position to one another. Along the dorsal fin base 6 (7,5) scutes; 8 (8,9) scutes between the last dorsal fin ray and the base of the adipose fin spine; 6 (6,6) scutes between the base of the adipose fin spine and the procurrent caudal fin spinule. One (1, 1) azygous preadipose scute. Along the anal fin base 3 (2, 2) scutes; 10 (11, 11) scutes between the last anal fin ray and the procurrent caudal fin spinule. Just behind the head 4 (4, 4) scutes at either side in transverse series, leaving a wide naked area dorsal to the lowest of these scutes. Along the base of the adipose fin membrane 3 (2, 2) scutes. Body scutes in 5 principal longitudinal series.



Fig. 4. *Exastilithoxus hoedemani* n. sp., anterior part of the holotype in ventral view.

D with a small procurvent spinule, which is part of the dorsal fin spine locking mechanism, and I, 6, i; A I, 4, i; P₁ I, 6; P₂ I, 5; C I, 14, I (I + 7 + 7 + I), with one procurvent spinule in front of the upper and the lower lobe.

Evertible interopercular odontodes 19/17 (13/13, present, though not everted in the small paratype, which is a juvenile).

Premaxillary teeth 2/3 (2/3, 3/3); mandibular teeth 4/6 (6/7, 5/6).

Upper lip barbels 5/5 (7/6, 6/5), lower lip barbels 12/12 (11/10, 10/10).

Shape and structure (figs. 3–4): In the holotype and the larger paratype, the odontodes on the scutes, cleithrum, head, pectoral, pelvic, and adipose fins are much less prominent than those in *E. fimbriatus*. The pectoral and pelvic fin spines are laterally and ventrally covered with rather large, flat, and somewhat blunt odontodes.

The body scutes of the juvenile paratype bear some longitudinal series of prominent odontodes, especially along the midline of the body, and posterior to the pelvic fin base, the latter series continuing to the ventral, triangular scutelet on the lower caudal fin lobe.

The sides and dorsum of the snout covered with small, irregular, firmly fused scutelets.

The anterior evertible interopercular odontodes are well distinguishable from the adjacent invertebrate odontodes.

The dorsal fin rays form an oblique, slightly convex distal outline. Anal, pectoral, and pelvic fin rays form an almost perpendicular distal outline. Caudal fin emarginate, with acute tips on upper and lower lobes. Adipose fin membrane triangular, with a short base in holotype and larger paratype, with a long base in the juvenile paratype.

Lateral line and head pores weakly visible.

Distal margin of operculum roundish.

Ventral surface of the lips completely covered with flat, irregular papillae, those near the buccal cavity and around the base of the premaxilla largest. The numerous lip barbels are papillate. The lower lip barbels are about twice as long as the upper lip barbels (largest one in the holotype 1.5 mm long).

Premaxillary teeth much more solid and larger than those in the mandible; they are strongly bifid, with a long inner lobe and a broad outer lobe. Mandibular teeth simple, with a long, acute crown which curves towards the buccal cavity.

Eyes with a horizontally oval iris, not covered by a flap as in many other Loricariidae.

Colour in alcohol (figs. 3–4). – Ground colour pale tan. Head and body with large, roundish blotches and spots, leaving transverse pale tan stripes on dorsum of the body, one halfway the dorsal fin base, one four scutes beyond the dorsal fin, and one halfway the adipose fin base. Ventral side of caudal peduncle (posterior to about the origin of pelvic fins) with vague brownish pigmentation, including obscure darker spots. Spine and rays of dorsal, pectoral, pelvic, anal, and adipose fins with conspicuous dark brown blotches and spots, arranged into vague horizontal or oblique lines. Similar markings form about three undulate vertical bands in the caudal fin.

The juvenile is marbled with pale tan and brown. It has wide pale areas on dorsum and sides of the snout, a semicircular pale area around the supraoccipital process, and three well-defined pale transverse stripes on the dorsum of body. The spots on the dorsal, pectoral, pelvic, and anal fins are comparatively poorly developed; the caudal fin has two well-defined vertical zig-zag stripes.

Etymology: *Exastilithoxus hoedemani* is named in the memory of Jacobus Johannes Hoedeman (1917–1982), Dutch ichthyologist.

Comparison

Exastilithoxus hoedemani differs strikingly from *E. fimbriatus* in colour pattern and in courseness of the scutes and other dermal ossifications. The holotype of *E. fimbriatus* is a nuptial male, which may account for the development of more conspicuous odontodes than present in the three type-spe-

cimens of *E. hoedemani*. *Exastilithoxus hoedemani* furthermore differs from *E. fimbriatus* in having 5 rather than 4 predorsal scutes, 5–7 against 8 scutes along the dorsal fin base, 8–9 instead of 6 scutes between the last dorsal fin ray and the base of the adipose fin spine, 6 against 7 scutes between the base of the adipose fin spine and the procurvent caudal fin spinule, and in having 4 rather than 3 scutes at either side just behind the head in transverse series. The 13 caudal fin rays of *E. fimbriatus* may well be just an aberration from the normal count of 14 caudal fin rays in all other Lithoxina (and other Ancistriinae), including *E. hoedemani*. *Exastilithoxus hoedemani* has up to 19 evertible interopercular odontodes, *E. fimbriatus* has up to about 37 of such odontodes, which in addition are longer than those in *E. hoedemani*. *Exastilithoxus hoedemani* finally differs from *E. fimbriatus* in a large number of proportions (see table 1): head length, postdorsal and postanal length, dorsal fin base, interdorsal length, anal fin spine length, anal fin height, adipose fin spine length, lower caudal fin spine length, snout length, lower lip length (although the lips of the holotype of *E. fimbriatus* have been dried up), length of the protruding part of the maxillary barbel, thoracic length, maximum orbital diameter, interorbital width, body depth at dorsal fin origin, and width of the caudal peduncle.

A number of these differences will disappear when more specimens of both species will be available. A large number of differences, however, leave no doubt about the distinction of *E. fimbriatus* and *E. hoedemani*.

References

- BOESEMANN, M. 1982: The South American mailed catfish genus *Lithoxus* Eigenmann, 1910, with the description of three new species from Surinam and French Guiana and records of related species (Siluriformes, Loricariidae). – Proc. Kon. Ned. Akad. Wetensch., (C), 85(1): 41–58, pls. 1–5.
- FERNÁNDEZ YÉPEZ, A. 1946: Ictiología. Corronchos, Panaques y Agujas de Venezuela. – Publ. Establ. Venez. Cienc. nat. Caracas 1(2): 1–8.
- GOSLINE, W. A. 1945: Catálogo dos nematognathos de água-doce da América do Sul e Central. – Bol. Mus. nac. Rio de Janeiro, (n. s.), Zool. 33: 1–138.
- HEITMANS, W. R. B., H. NIJSSSEN & I. J. H. ISBRÜCKER 1983: The mailed catfish genus *Lasiancistrus* Regan, 1904, from French Guiana and Surinam, with descriptions of two new species (Pisces, Siluriformes, Loricariidae). – Bijdr. Dierk., 53(1): 33–48.
- ISBRÜCKER, I. J. H. 1979: Descriptions préliminaires de nouveaux taxa de la famille des Loricariidae, Poissons-Chats cuirassés néotropicaux, avec un catalogue critique de la sous-famille nominale (Pisces, Siluriformes). – Rev. fr. Aquariol. Herpétol. 5(4): 86–116.
- — 1980: Classification and catalogue of the mailed Loricariidae (Pisces, Siluriformes). – Versl. Techn. Geg., Inst. Taxon. Zoöl. (Zoöl. Mus.), Univ. Amsterdam 22: 1–181.
- MAGO LECCIA, F. 1970: Lista dos pees de Venezuela, incluyendo un estudio preliminar sobre la ictiogeografía del país (Off. nac. Pesc., Caracas): 1–275, 31 unnumbered photographs.
- STEINDACHNER, F. 1915a: [Das w. M. Hofrat F. Steindachner erstattet einen vorläufigen Bericht über einige neue Süßwasserfische aus Südamerika, ... etc.]. – Anz. Akad. Wiss. Wien, mathem.-naturwiss. Kl., 25(17): 199–202 (reprint pp. 1–3).
- — 1915b: Beiträge zur Kenntnis der Flußfische Südamerikas V. – Denkschr. Akad. Wiss. Wien, mathem.-naturwiss. Kl. 93: 15–106, 13 pls. (reprint pp. 1–92).

Dr. Isaac J. H. Isbrücker and Dr. Han Nijssen,
Institute of Taxonomic Zoology, University of Amsterdam,
P. O. Box 20125, 1000 HC Amsterdam, The Netherlands.